Academic Satisfaction of Pedagogy Students Regarding Learning in Virtual Mode

Fabián Muñoz
Universidad Católica del Maule, Ph D. Program in Education, Talca, Chile
Universidad de La Frontera, Temuco, Chile

Juan Carlos Beltrán
Universidad de La Frontera, Temuco, Chile
Universidad Mayor, Temuco, Chile

Regina Alves
Universidade do Minho, Braga, Portugal

Fabián Rodríguez
Universidad de La Frontera, Temuco, Chile

Abstract. The Covid-19 pandemic in Chile was declared as such in March 2020. As a result, the Ministry of Education compiled guidelines to provide continuity to the formative processes, through which the concept of remote learning emerged. This research paper aims at identifying academic satisfaction of pedagogy students in a higher education institution (HEI) regarding learning in the virtual mode in the pandemic context. A quantitative, non-experimental, cross-sectional methodology was used. The sample consisted of 337 students in 6 pedagogical courses at an HEI in the Araucanía region to whom a questionnaire on satisfaction with virtual teaching was administered. Results indicated that student satisfaction was low regarding the way content was handled and evaluation mechanisms used in the virtual mode. However, high satisfaction was shown in the items corresponding to teacher-student interaction. In addition, we found no statistically significant differences in the items related to the fulfillment of expectations and learning achieved in the virtual mode, either by gender, level of study, program, or academic performance. Finally, there was high dissatisfaction with virtual teaching during the present academic cycle. We recommend the systematic evaluation of the indicators of educational quality, mainly linked to the treatment of the content, the evaluation mechanisms used, and the teacher-student interaction channels, since they improve the academic performance of HEIs.

Keywords: distance learning; education; higher education; performance; satisfaction

1. Introduction

The context of the pandemic caused by the new SARS-CoV-2 coronavirus and the disease it causes (Covid-19) has generated an unprecedented health crisis worldwide. The exponential increase of infections forced the World Health Organization (WHO) to declare a public health emergency of international scope on January 30, 2020, and by March 11 of the same year, it was declared a pandemic. Simultaneously, WHO presented a series of recommendations and measures to contain the infections and effects of the mentioned virus to put a stop to the spreading and secure the population's wellbeing. Measures that stood out were to increase the conditions of hygiene and to diminish the possibilities of people coming in physical contact with each other, hence the necessary social distancing.

The impact of this disease has been of such extent that different areas have been affected, for instance higher education. Many institutions had to temporarily suspend many of their activities, affecting about 165 million students in Latin America and the Caribbean alone, due to the social immobilization and mandatory isolation that were enforced by health authorities as strategies to reduce the spread of the virus (Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO], 2020a). Ducoing (2020) pointed out that Covid-19 has conditioned most governments to definitively close teaching institutions, thereby preventing the spread of the virus. To give continuity to the training and teaching-learning processes, UNESCO (2020b) recommended the use of information and communication technologies (ICTs) as an indispensable tool for developing educational work at all levels.

Under this new educational paradigm, higher education institutions (HEIs) have adhered to the measures of social distancing and mandatory interruption of academic activities, aiming at the in-person context and all related activities. Thus, a new educational scenario has emerged spontaneously – the virtual mode. This gave rise to the imminent search for changes and adaptations to make the continuity of teaching practices and evaluation processes both feasible and practical simultaneously, traditionally consolidated in a face-to-face teaching-learning model. Therefore, the challenge for university authorities and teachers has been to focus on the incorporation of new didactic strategies, the adaptation of teaching materials and activities, and the implementation of flexible learning models. Special emphasis has been put on initial teacher training, allowing and guaranteeing the curricular appropriation of student teachers (Hamdy, 2018) under this new way to facilitate teaching and learning processes.

Of course, the situation in the Chilean teaching context is no different from that experienced at the international level once this new disease began to spread. The pandemic was declared as such nationwide in March 2020. On March 15, 2020, the Ministry of Education communicated a series of guidelines to provide continuity to the educational processes. In the case of higher education, the Ministry of Education (Ministerio de Educación [MINEDUC], 2020a) established a sanitary regime effective from March 13 to reduce risks by isolating cases and communities. Based on this measure, an action plan was established to face the

contingency that considers the provision of access to the online teaching platform Google Suite. The plan also included securing funding for institutions in order to develop and strengthen online education funds for the development and strengthening of online projects and permanent dissemination of good practices and training for teachers in online mode, formally establishing virtual teaching.

Adhering to these orientations and measures to face this new educational scenario and the new relationships established in this social distancing context, the Undersecretary of Higher Education (MINEDUC, 2020b) informed a series of mechanisms to the country's universities to give continuity to the formative processes. Similarly, since April 2020, an inspection plan was carried out by the Superintendent of Higher Education with the purpose of promoting the development of educational quality and monitor the implementation of virtual teaching environments in the various institutions at the national level.

Despite the educational difficulties catalyzed by the pandemic, which meant changing a large part of the usual practices of teachers and students (García-Aretio, 2021), it is evident that HEIs made important efforts to break the traditional structure and deliver a series of additional services in initial teacher training. The transition from a face-to-face teaching-learning space to a virtual one required the use of educational and communicational platforms (Prendes-Espinosa & Cerdán-Cartagena, 2021), becoming essential to continue academic activities in virtual environments. However, the frequent use of these tools does not necessarily mean better learning, due to the methodologies and practices of their implementation (Sánchez-Mendiola et al., 2020), which is closely linked to the lack of student follow-up regarding learning and teacher training (Verduna et al., 2020). This context requires greater skill in the use of ICT and the implementation of new teaching strategies (Chávez, 2020) to generate significant learning.

The way content is handled, the methodological strategies, and the evaluation processes implemented in the virtual mode pose difficulties and challenges that focus their attention on educational quality. For this reason, this research wishes to determine the academic satisfaction of pedagogy students regarding learning in virtual mode (content, methodology, evaluation) during the pandemic period and compare it in relation to their sociodemographic characteristics. The research is based on the gaps that surround the situation described. Consequently, the need to know the implications of the effects of teaching in virtual mode during the pandemic period on student satisfaction from a scientific perspective emerges as an issue in current public debate.

The findings of this research will be of vital importance for university authorities and units that manage the curricular framework of undergraduate courses, since they will be able to implement corrective pedagogical actions based on empirical data. It is expected to strengthen areas such as the organization and content management in virtual classrooms, contextualized evaluations relevant to virtuality, correct use of digital tools and resources, as well as the promotion of teacher-student interaction in virtual teaching spaces. In the same way, it will

serve as a reference for future studies on the subject, considering the relevance and generalization of the problem in universities with a national and international scope.

2. Literature Review
2.1 Teaching in Virtual Mode
Literature has defined teaching in virtual mode as the conglomerate of training actions that are mediated by ICT tools that allow fluent two-way communication between teacher and student (Bonilla-Guachamín, 2016), reducing barriers such as time and space, which are significant in the face-to-face mode. Undoubtedly, virtual teaching has been presented as an educational alternative for quite some time. However, it is undeniable that the global pandemic scenario increased the use of digital tools and platforms, due to the opportunities that this teaching mode offers. Among the opportunities are new educational experiences, access to various learning resources, and a high degree of interaction between the student and teacher (Cedeño-Solorzano et al., 2021).

The confinement by Covid-19 forced the population into indefinite isolation. In this context, teaching in virtual mode took on an indescribable value, due to how unnecessary the physical meeting is to promote channels of interaction between the teacher and the student (Santana-Sardi et al., 2020). It became a mechanism that temporarily resolved the challenge experienced by universities to provide continuity to the training processes.

Initially, globalization positioned the use of technological tools to favor unlimited communication and interconnection between stakeholders. However, it is necessary to point out that the pandemic scenario caused an unprecedented break in terms of the massive use of ICTs to carry out teaching-learning processes, occupying a valuable space in HEIs (Expósito & Marsollier, 2020).

2.2 Educational Practices in Virtual Mode
Various HEIs have experimented with implementing emerging study modalities linked to the use of ICTs, moving from traditional teaching (in-person) to virtual teaching environments (Fernández-Pascual et al., 2013). They have thereby highlighted the importance of ICT in teacher training and continuous learning.

In one of their many investigations, Cabero et al. (2010) analyzed the development of introductory courses in philosophy and introductory physics. Two hundred and eighty-four (284) students from the Pontificia Universidad Católica Madre y Maestra de la República Dominicana (PUCMM) participated in b-learning mode. To acquire the data they needed, they utilized a university student satisfaction questionnaire (CASAUF), a virtual survey of students, and an online interview with teachers and tutors. Results showed a tendency by students to favor those dimensions related to the online teacher/tutor and unfavorable aspects concerning those referring to communication between teacher-student and peers. The researchers concluded that the students who participated in the b-learning courses demonstrated medium satisfaction with the online learning experience.

Likewise, Zambrano (2016) conducted correlational research in which he determined a strong relationship between relevant teacher response and student satisfaction (r = 0.26), course quality (r = 0.52), and diversity of learning assessment (r = 0.41), respectively. All those previous indicators are related to the study of the predictive components of satisfaction of distance learning students. In addition, the stepwise regression analysis found that the factors of course flexibility, teacher attitude towards e-learning, student self-efficacy in internet use, and perception of interaction predicted student satisfaction of 47.2%. A similar situation was observed in the non-experimental study by Viloria and González (2019). These researchers addressed the communicative dimension (focusing on the use of videoconferencing) used by teachers to maintain the idea of connecting with their students. They found that this type of resource (videoconferencing) was only used 50% of the time as a communication tool. They recommended creating continuous training plans for teachers to improve the use of communication tools in virtual learning environments.

On his part, Durán (2016) conducted research with students at the Polytechnic Institute of Panama. He identified a high degree of satisfaction (44%) among students with the expectations or learning results of the virtual platform. In addition, 77.8% of students claimed to have met their expectations in the virtual teaching mode and 100% with the classes provided by the teacher.

Similarly, Estrada-Araoz et al. (2020) conducted a study with the aim of quantifying the attitudes of university students towards virtual teaching implemented during the pandemic. The results showed that most students have an indifferent attitude towards virtual education. In addition, statistically significant differences were found between the sex and age groups of the 145 students who made up the sample.

Furthermore, Taveras et al. (2021) determined students' satisfaction with virtual teaching during the pandemic through a quantitative, non-experimental study in which 2,806 subjects participated. The results showed that students were satisfied with the teaching practices, activities, resources, and accompaniment. On the contrary, students were not satisfied with the conditions of and technical support to access virtual classes.

There is sufficient evidence relating various experiences of the student body regarding satisfaction of teaching in virtual mode. However, more in-depth investigation needs to be done to understand the phenomenon in a contextualized way and based on lived student experiences in the university at the local level. This needs to be done considering that this scenario of uncertainty underlies the momentary return of teaching in the face-to-face mode.

3. Methodology
3.1 Sample
A cross-sectional study was conducted during the academic year 2020–2021. The sample included 337 pedagogy students belonging to 6 teacher training programs

of a Chilean university, collected via convenience sampling. The sociodemographic information of respondents is presented in Table 1.

Of the 337 respondents, 162 were female (48%) and 175 were male (52%). Furthermore, 91 respondents were in their first year of study (27%), 73 in their second year (21.6%), 74 in their third year (22%), and 99 in their fourth year (29.4%). Regarding the teaching program of the respondents, 27 (8%) were studying Spanish and communication; 40 (11.8%) science, majoring in biology, chemistry, or physics; 100 (29.6%) physical education, sports, and recreation; 50 (14.8%) history, geography, and civic education; 75 (22.2%) English; and 45 (13.3%) mathematics.

Table 1: Sociodemographic characterization of the respondents

	Variable	n	%
	Spanish and communication	27	8
	Science, majoring in biology, chemistry, or physics	40	11.8
	Physical education, sports, and recreation	100	29.6
Program	History, geography, and civic education	50	14.8
	English	75	22.2
	Mathematics	45	13.3
	1	91	27
	2	73	21.6
Year of study	3	74	22
	4	99	29.4
Sex	Male	175	52
	Female	162	48

3.2 Instrument
The instrument used in this study was the satisfaction scale (Flores-Ferro et al., 2021), which comprises 13 items (see Table 2). These items inquire about students' satisfaction with teaching procedures in the virtual mode, highlighting the development of lectures, content, evaluations, and teacher-student interaction. The scale is a 5-point Likert-type scale, ranging from 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree*. The Cronbach alpha for the scale calculated with the sample of this study was good (a = .849). In addition to these items, sociodemographic elements are included: gender, academic achievement, level of study, and teaching program.

3.3 Procedure
To ensure the optimal collection of data for this study, the first approach with the respondents involved using a formal letter sent to their respective e-mail addresses, inviting them to participate in the study voluntarily. The goal of distributing this letter to all possible candidates was to clearly explain the framework in which the research were to be carried out, the objectives, methodological aspects, and when specifically their participation would be requested. Likewise, it was explained that given the current health emergency in the country, informed consent could be completed online through a link directed to the respective questionnaire. This instrument indicated the conditions of participation, thus complying with the ethical and formal requirements of any

research process. For this purpose, if a respondent agreed to participate in the research and that they had read and understood what their participation would entail, they authorized their participation in this study in a free and voluntary manner. The questionnaire was administered during the first academic semester of 2021. Furthermore, respondents were notified that given the health emergency that the country was experiencing, the questionnaire would be completed online through a link that would direct them to the respective form, with an estimated response time of 10 to 15 minutes.

3.4 Data Analysis

The statistical program IBM Statistical Package for the Social Sciences (SPSS) for Windows, version 25, Armonk, NY, USA was used in data analysis. SPSS works with descriptive statistics such as frequencies, means, and percentages. Reliability was determined through the calculation of Cronbach's alpha (*a*). In addition, the independent *t* test and analysis of variance (ANOVA) were used, as appropriate, with a significance level of 0.05, to determine whether there were statistically significant differences between academic satisfaction with virtual teaching and the respondents' sociodemographic characteristics. We decided to dichotomize the variable of academic satisfaction with virtual teaching to better show respondents' perception of the items that made up the measuring instrument. The dichotomization was done by adding answers 1, 2, and 3, classifying them as *No*, and answers 4 and 5 as *Yes*. Finally, the following categories were used to determine the academic performance of respondents: *failed* (1–3.99); *passed* (4–4.5); *distinction* (4.51–5.5); *maximum distinction* (5.51–6.5); and *unanimous distinction* (6.51–7).

4. Results

Table 2 shows the frequencies achieved of the total sample for each of the questionnaire items on the scale of satisfaction with virtual teaching. Concerning the academic satisfaction of the respondents, item 12 obtained the highest percentage of satisfaction (66.2%), followed by item 7 (65.9%). This proves that the strategies implemented for interaction between student respondents and faculty were relevant. On the contrary, item 2 obtained the lowest percentage of satisfaction with teaching in virtual mode (10.4%), followed by item 11 (19.3%). Items 3 (42.2%), 4 (57.8%), and 13 (33.8%) were concerned with strategies used for the development of the evaluations and organization of the subjects in virtual mode and reflected low satisfaction among respondents. In general terms, respondents negatively evaluated learning in virtual mode, emphasizing mainly the development of content, organization of time, and didactic resources.

Table 2: Distribution of percentages on the satisfaction scale regarding learning in virtual mode

Item	No(n)(%)	Yes(n)(%)
1. In general, the virtual courses have met my expectations	243 72.1	94 27.9
2. I have learned the same as if the courses had been entirely in-person	302 89.6	35 10.4
3. The evaluation system of the subjects in virtual mode seems adequate	195 57.8	142 42.2

4. The evaluation guidelines for the virtual mode subjects have been clear and concise	142 42.2	195 57.8
5. The activities requested in the virtual mode subjects have had an adequate degree of difficulty	150 44.5	187 55.5
6. The deadlines for delivering assignments in the virtual modality have been appropriate	139 41.3	198 58.7
7. Various resources (notes, guides, articles, etc.) have been included to complement the virtual courses	115 34.1	222 65.9
8. The online communication tools (Zoom, Teams, Meet, etc.) have helped build a learning community among my professors, classmates, and myself in the virtual courses	126 37.4	211 62.6
9. I consider useful the use of forums in the subjects in virtual mode	193 57.3	144 42.7
10. I have always felt accompanied during the subjects' work in virtual mode	244 72.4	93 27.6
11. The strategies used in the virtual modality subjects are motivating to study	272 80.7	65 19.3
12. I have been able to contact my teachers of the subjects in virtual mode quickly and permanently through communication tools (e-mail, WhatsApp, chat, etc.)	114 33.8	223 66.2
13. I think the class implementation of the subjects in virtual mode has been well organized to take advantage of the most time possible	223 66.2	114 33.8

Figures 1 and 2 show the percentages achieved for items 1 and 2, respectively, of the satisfaction scale with virtual teaching comparing the frequencies for male and female respondents. Both items 1 and 2 yielded higher scores in favor of the female respondents (29.7% and 11.1%, respectively). However, there were no significant differences for the two items ($x^2(1) = .468$, $p > .05$; $x^2(1) = .176$, $p > .05$). This means that both male and female respondents showed low satisfaction when asked about expectations and learning achieved in virtual teaching environments.
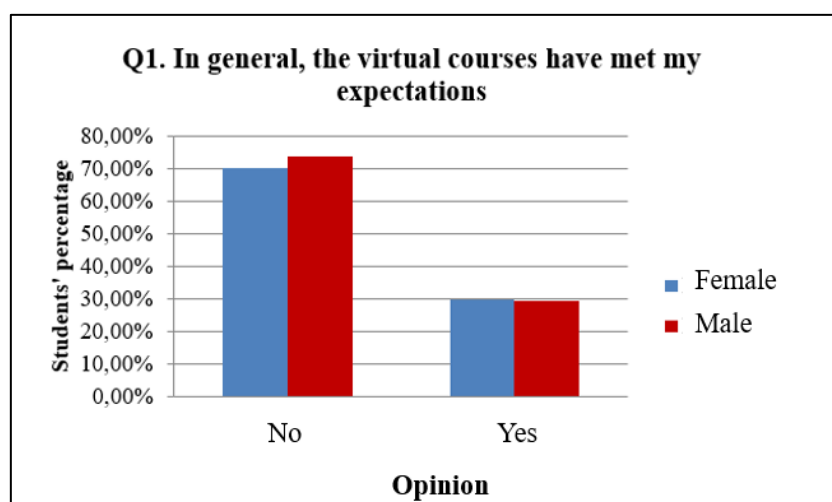

Figure 1: Comparison of percentages obtained for item 1 of the virtual teaching satisfaction scale, according to sample gender
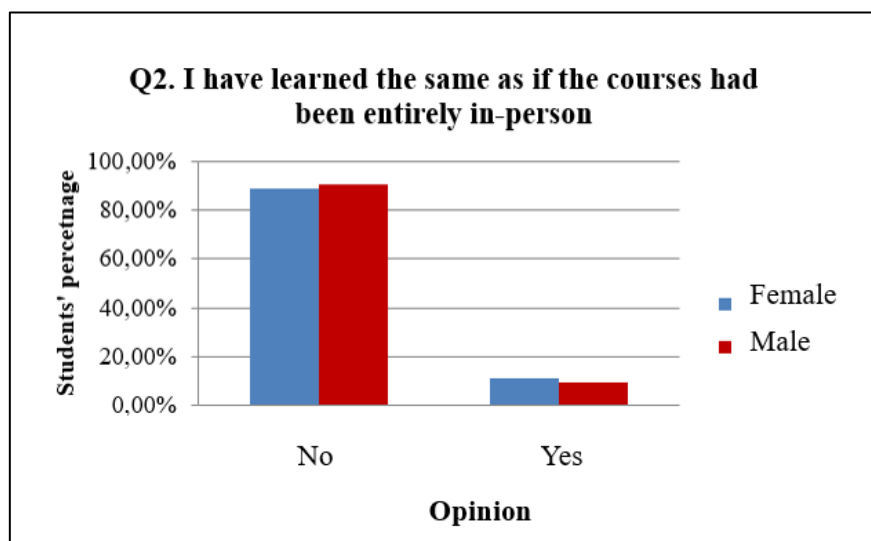
Figure 2: Comparison of the percentages obtained for item 2 of the virtual teaching satisfaction scale, according to sample gender

Tables 3 and 4 show the percentages obtained for items 1 and 2, respectively, according to the level of study of the sample. Item 1 presented higher scores for respondents in their fourth (33.4%) and second (30.1%) years, although without significant differences ($x^2(3) = 6.799$, $p > .05$). Likewise, item 2 presented higher scores for respondents in their second (16.5%) and fourth (10.1%) years. Similarly, there were no significant differences ($x^2(3) = 4.356$, $p > .05$).

Table 3: Comparison of percentages obtained for item 1 of the scale of satisfaction with virtual teaching, according to the year of study of the sample

Year of Study	No n (%)	Yes n (%)
1	64 (70.3)	27 (29.7)
2	51 (69.9)	22 (30.1)
3	62 (83.7)	12 (16.3)
4	66 (66.6)	33 (33.4)
Total	243 (72.1)	94 (27.9)

Table 4: Comparison of percentages obtained for item 2 of the scale of satisfaction with virtual teaching, according to the year of study of the sample

Year of study	No n (%)	Yes n (%)
1	85 (93.4)	6 (6.6)
2	61 (83.5)	12 (16.5)
3	67 (90.5)	17 (9.5)
4	89 (89.9)	10 (10.1)
Total	302 (89.4)	35 (10.6)

The trend in the above scores shows low academic satisfaction among respondents regarding the expectations and learning achieved in virtual teaching environments, regardless of their level of study. This area showed significant academic dissatisfaction among respondents in their third and first years.

Tables 5 and 6 show the relationship between the program of the students surveyed and items 1 and 2.

Table 5: Comparison of percentages obtained for item 1 of the scale of satisfaction with teaching in virtual mode, according to the program to which the sample belonged

Program	No n (%)	Yes n (%)
Spanish and communication	15 (55.6)	12 (44.4)
Science, majoring in biology, chemistry, or physics	29 (72.5)	11 (27.5)
Physical education, sports, and recreation	70 (70)	30 (30)
History, geography, and civic education	37 (74)	13 (26)
English	58 (77.3)	17 (22.7)
Mathematics	34 (75.6)	11 (24.4)
Total	243 (72.1)	94 (27.9)

Item 1 presented higher scores for the respondents in the physical education, sports, and recreation teaching training program (30%) and the sciences, majoring in biology, chemistry, or physics teaching training program (27.5%).

Table 6: Comparison of percentages obtained for item 2 of the scale of satisfaction with teaching in virtual mode, according to the program to which the sample belonged

Program	No n (%)	Yes n (%)
Spanish and communication	26 (96.3)	1 (3.7)
Science, majoring in biology, chemistry, or physics	33 (82.5)	7 (17.5)
Physical education, sports, and recreation	95 (95)	5 (5)
History, geography, and civic education	40 (80)	10 (20)
English	70 (93.3)	5 (6.7)
Mathematics	38 (84.4)	7 (15.6)
Total	302 (89.6)	35 (11.4)

Item 2 presented higher scores for respondents belonging to the science teaching training program, majoring in biology, chemistry, or physics (17.5%) and the history, geography, and civic education teaching training program (20%). However, the trend shows low academic satisfaction regarding the expectations and learning achieved in virtual teaching environments, regardless of the program. In this area, high dissatisfaction was observed by respondents in the physical education, sports, and recreation teaching training program (95%) and those in the Spanish and communication teaching training program (96.3%). In this sense, it is important to mention that there were no significant differences for item 1 ($x^2(5) = 5.275$, $p > .05$). However, for item 2, it was verified that the respondents in the Spanish and communication program were more satisfied compared to those in the other programs ($x^2(5) = 13.960$, $p < .05$).

Figures 3 and 4 show the percentages achieved for items 1 and 2 in relation to the scale of satisfaction with teaching in virtual mode according to the academic performance of respondents. Concerning academic satisfaction of the

respondents, item 1 presented higher scores in the category of unanimous distinction (44.5%). Likewise, item 2 presented higher scores in the passed category (12.5%).
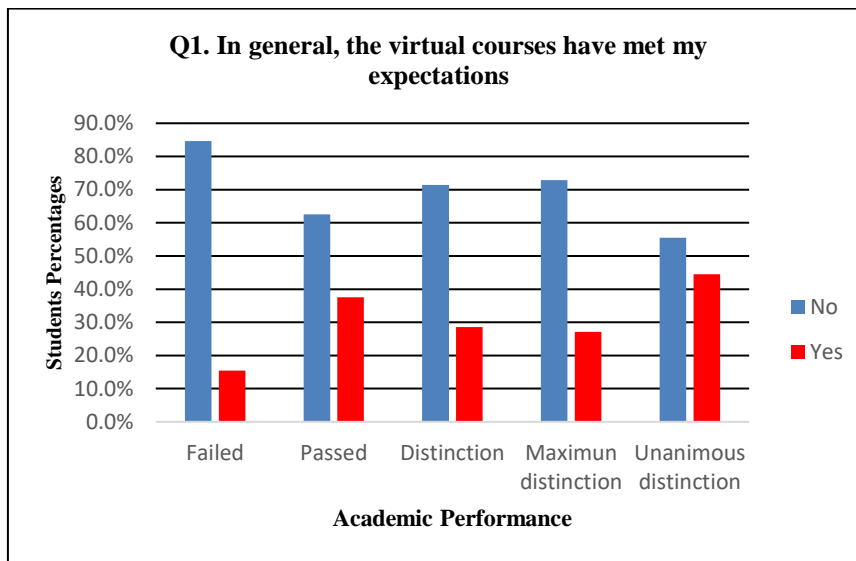

Figure 3: Comparison of percentages obtained for item 1 of the virtual teaching satisfaction scale, according to the academic performance of the sample
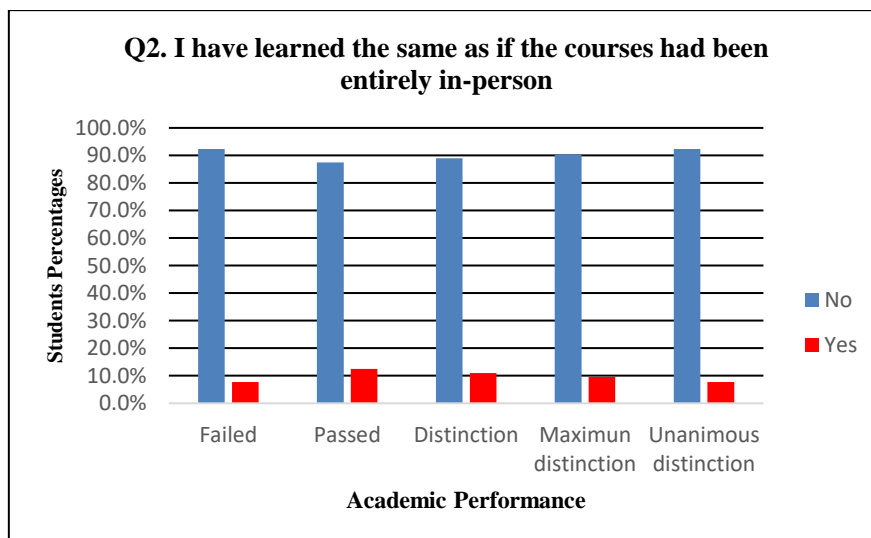

Figure 4: Comparison of percentages obtained for item 2 of the virtual teaching satisfaction scale, according to the academic performance of the sample

The above trend shows low academic satisfaction regarding the expectations and learning achieved in virtual teaching environments, regardless of the academic performance of the respondents in their educational program. From this, a significant level of academic dissatisfaction can be seen by respondents belonging to the passed and unanimous distinction categories. Based on the above, it can be evidenced that there were no significant differences ($x^2(4) = 2.686$, $p > .05$; $x^2(4) = 1.665$, $p > .05$).

5. Discussion

The results showed deficient learning among respondents from the virtual mode. In this sense, only 10.4% of respondents indicated being satisfied with learning in a virtual mode, hence low satisfaction was determined. This is firstly due to the absence of face-to-face interaction between teachers and students. With the in-person situation, the parties are subjective and accessible to each other, that is decidedly close, and the other is completely real (Berger & Luckmann, 2001). This implies a direct relationship, which is constituted when the one party (the student) is aware of the person in front of them (the teacher) and, by this, assumes an orientation towards them (Schutz, 1993). This precedent allows the student body to share the space experientially in a communicative and common environment (Rizo, 2012). The above is closely related to the sociocultural perspective, which implies a natural beneficial process of cognitive and social transformation, given that it occurs in a collaborative context. In other words, people learn by observing and participating with other individuals through the mediation of cultural artifacts in goal-directed activities that allow them to understand reality (Antón, 2010). On the contrary, virtual education has led to the reduction or elimination of social contact between classmates and other educational agents (Aguilar, 2020). In this context, the lack of access to face-to-face classes leads to a loss of learning (García-Riveros et al., 2021).

On the other hand, learning should be developed from a context-oriented perspective; in this sense, Páramo et al. (2015) indicated that teaching must adapt situations and activities in a real context, so that learning is situated. This implies learning by doing, considering the lived experience, mediated by the culture and the context of the student. Learning becomes relevant and therefore useful through the interaction between the student, teacher, and context in the development of various real and in-site activities that occur daily. These are based on a flow of knowledge and experiences from a mediating and collaborative perspective based on dialogue and understanding. This coincides with the results of the study by Taveras et al. (2021), who evidenced a dissatisfaction among university students regarding the communication spaces enabled in virtual teaching environments. These authors emphasized that physical isolation should not condition teacher-student interaction; on the contrary, the educational resources used should increase this interaction.

Furthermore, we found that the evaluation system used in virtual teaching was inadequate, as reflected in the satisfaction levels of respondents of 57.8%. In this sense, one of the features that characterizes teaching in virtual mode is the use of multiple educational tools and resources (presentations, videos, discussion forums and consultations, social networks, tasks, etc.) to carry out the evaluations. These are, however, scarcely used by the teaching staff in higher education (Mercader, 2019). This implies that the evaluation method would be focused on the results and not on the process. Likewise, Blázquez and Lucero (2009) indicated that this form of evaluation is focused on verifying the degree to which the student achieved the planned objectives and, in addition, verifies the achievement of objectives. Therefore, the evaluation would focus on control and measurement, which would be expressed in quantitative results reflected in a grade (Beltrán-

Véliz et al., 2020). This implies that the evaluation is not focused on the learning process, which is reflected in the difficulties that teachers face when systematically generating instances of evaluation of the learning process (Ibaceta-Vergara & Villanueva-Morales, 2021).

On the contrary, according to Ahumada (2001), "assessment should be considered as a process and not as an event and should be a means and never an end" (p. 3). In other words, assessment should be centered on the diversity and context of the student body, as well as offering continuous and timely written and oral feedback. It should also consider error as a natural element of learning (Ahumada, 2001). In this regard, Martínez-Mínguez et al. (2015) stated that only from the understanding of assessment as a formative experience can it be expected that students become aware of how their learning evolves and to what extent they can use and apply the knowledge and cognitive, affective, and social skills developed in a variety of contexts. From this perspective, virtual education should not only focus on the evaluation of specific products (summative evaluation). Monitoring and follow-up opportunities must also be provided in the learning process (formative evaluation) (Santacruz, 2020), which allows evidencing of the student's progress based on the contents assimilated in their training. In this way, the evaluative practice is transformed, and in turn, learning through autonomy and reflection is improved (García-Riveros et al., 2021). To this end, dialogue, collaboration, and systematic reflection should be considered key elements in generating knowledge. In this context, the evaluation guidelines must be made using criteria coherent with the teaching and learning process, where disciplinary, procedural, attitudinal, ethical, and affective knowledge converge. At the same time, it must be mediated by the characteristics, styles, and rhythms of learning and by the social and cultural context of the students. This will contribute to developing formative assessment guidelines, techniques, and instruments (López et al., 2007) focused on learning.

Regarding academic performance in virtual teaching, 3.8% of respondents had failed a subject, which is primarily positive. However, the results showed no statistically significant differences between satisfaction regarding the fulfillment of respondents' expectations and learning and their academic performance. Castejón (2014) stated that the best teaching methods enable direct, active, and participatory contact, an atmosphere significantly diminished in virtual teaching. In this context, scientific evidence has reaffirmed the positive relationship between academic performance and interactions between teachers and students (Gómez, 2014). Students' connections with their peers and academics are irreplaceable; the benefits are multiple at a basic cognitive-psychological level (perception, attention, memory) and higher level (goals, self-esteem, self-efficacy). However, the incidence differs depending on the teaching contexts in which these interactions take place (Tomás-Miquel et al., 2016).

6. Conclusion

Technological evolution, after the accelerated digital metamorphosis in the context of the Covid-19 pandemic, has impacted different areas of knowledge, transforming the traditional educational model. Learning to use new

technological tools to improve students' learning experiences has undoubtedly become a persistent challenge for teachers. Despite the difficulties faced in the implementation of virtual teaching during this critical educational period, HEIs, together with the teaching staff, have managed to continue the training process. The results of this research showed high satisfaction among respondents with virtual teaching for items 8 (62.6%) and 12 (66.2%) concerning teacher-student interaction. Students value the innovation in the interaction mechanisms and the variety of tools and communication channels, consolidating learning communities in the virtual mode subjects. However, students generally negatively perceive the items that correspond to the treatment of the content and the evaluation mechanisms used in the virtual mode teaching. In this framework, we suggest the implementation of methodological strategies that promote student activity/action/reflection and facilitate cognitive, psychological, and motivational interaction, with the purpose of improving the quality of learning acquired in virtual mode. Likewise, we recommend the involvement of students in the construction of evaluation instruments, making them more relevant and contextualized to the reality of each of the pedagogical disciplines of the HEI. Regarding the treatment of the content, we suggest that students and teachers be trained in the use of digital tools and resources, which will allow them to interact smoothly and efficiently. It is necessary to specify that the conclusions presented are limited to the sample of university students who were part of the research. We therefore recommend using a larger sample, considering students from other faculties, programs, or fields of study, to allow broadening the generalization of the results. Additional research is needed, mainly qualitative, to allow a deeper understanding of the dissatisfaction shown in these dimensions.

7. References

Aguilar, F. D. (2020). Del aprendizaje en escenarios presenciales al aprendizaje virtual en tiempos de pandemia [From learning in face-to-face settings to virtual learning in times of pandemic]. *Estudios Pedagógicos*, *46*(3), 213–223. http://dx.doi.org/10.4067/S0718-07052020000300213

Ahumada, P. (2001). *La evaluación una concepción de aprendizaje significativo* [Evaluating the conception of significant learning]. Salesianos.

Antón, M. (2010). Aportaciones de la teoría sociocultural al estudio de la adquisición del español como segunda lengua [Contributions of sociocultural theory to the study of the acquisition of Spanish as a second language]. *Resla, 23*, 9–30. https://dialnet.unirioja.es/servlet/articulo?codigo=3897521

Beltrán-Véliz, J., Barros-Ketterer, J., & Carter-Thuillier, B. (2020). Racionalidad técnica-instrumental en educación física: Un estudio cualitativo en contexto chileno [Technical-instrumental rationality in physical education: A qualitative study in a Chilean context]. *Revista Espacios*, *41*(4), 19–29. https://revistaespacios.com/a20v41n04/20410419.html

Berger, P., & Luckmann, T. (2001). *La construcción social de la realidad* [The social construction of reality]. Amorrortu Editores.

Blázquez, F., & Lucero, M. (2009). La evaluación en educación [Evaluation in education]. In A. Medina, & F. Salvador (Eds.), *Didáctica general* (pp. 243–269). Pearson Educación S.A.

Bonilla-Guachamín, J. (2020). Las dos caras de la educación en el Covid-19 [The two faces of education in Covid-19]. *CienciAmérica, 9*(2), 89–98. https://doi.org/10.33210/ca.v9i2.294

Cabero, J., Llorente, M., & Puentes, Á. (2010). La satisfacción de los estudiantes en red en la formación semipresencial [The satisfaction of online students in blended learning]. *Revista Comunicar*, *18*(35), 149–157. https://doi.org/10.3916/C35-2010-03-08

Castejón, J. (2014). *Investigación y mejora de la educación: Hacia una práctica y política educativa basadas en la evidencia* [Research and improvement of education: Towards an evidence-based educational practice and policy]. Universidad de Alicante.

Cedeño-Solorzano, M. V., Pico-Franco, L. D. C., Palacios-Saltos, L. E., & Niemes-Muñoz, P. M. (2021). La efectividad de la educación virtual frente a la pandemia en Ecuador [The effectiveness of virtual education in the face of the pandemic in Ecuador]. *Dominio de las Ciencias*, *7*(2), 959–967. https://www.dominiodelasciencias.com/ojs/index.php/es/article/view/1839

Chávez, G. (2020). *Evaluación formativa en la educación virtual de dos instituciones educativas, Huaral* [Formative evaluation in virtual education of two educational institutions, Huaral] [Master's tesis]. Universidad César Vallejo. Repositorio institucional de la Universidad de César Vallejo. https://repositorio.ucv.edu.pe/handle/20.500.12692/52939

Ducoing, P. (2020). Una expresión de la desigualdad en educación básica durante la emergencia sanitaria: El caso de una alumna [An expression of inequality in basic education during the health emergency: The case of a student]. In H. Casanova Cardiel (Ed.), *Educación y pandemia: Una visión académica* (pp. 55-64). Universidad Nacional Autónoma de México, Instituto de Investigaciones sobre la Universidad y la Educación.

Durán, R. (2016). *La educación virtual universitaria como medio para mejorar las competencias genéricas y los aprendizajes a través de buenas prácticas docentes* [Virtual university education as a means to improve generic skills and learning through good teaching practices] [Doctoral thesis]. Universidad Politécnica de Cataluya. Repositorio institucional de Tesis Doctorals en Xarxa. https://tdx.cat/handle/10803/397710#page=1

Estrada-Araoz, E. G., Gallegos-Ramos, N. A., Mamani-Uchasara, H. J., & Huaypar-Loayza, K. H. (2020). Actitud de los estudiantes universitarios frente a la educación virtual en tiempos de la pandemia de Covid-19 [Attitude of university students towards virtual education in times of the Covid-19 pandemic]. *Revista Brasileira de Educação do Campo*, *5*, Article e10237. https://doi.org/10.20873/uft.rbec.e10237

Expósito, C. D., & Marsollier, R. G. (2020). Virtualidad y educación en tiempos de Covid-19: Un estudio empírico en Argentina [Virtuality and education in times of Covid-19: An empirical study in Argentina]. *Educación y Humanismo*, *22*(39). https://doi.org/10.17081/eduhum.22.39.4214

Fernández-Pascual., M., Ferrer-Cascales., R., & Reig-Ferrer., A. (2013). Entornos virtuales: Predicción de la satisfacción en contexto universitario [Virtual environments: Prediction of satisfaction in a university context]. *Pixel-Bit. Revista de Medios y Educación*, *43*, 167–181. https://doi.org/10.12795/pixelbit.2013.i43.12

Flores-Ferro, E., Maurera-Cid, F., Hadweh-Briceño, M., Alonso-Gutiérrez Duarte, S., Silva-Salse, Á, Peña- Troncoso, S., Castillo-Retamal, F., González-Flores, P., Pauvif-Cárcamo, F., Bahamondes Acevedo, V., Zapata Vera, G., Zavala-Crichton, J. P., Maureira Sánchez, J., Brevis-Yever, M., & Lagos-Olivos, C. (2021). Nivel de satisfacción de las clases online por parte de los estudiantes de educación física de Chile en tiempos de pandemia [Level of satisfaction of online classes by students of physical education of Chile in times of pandemic]. *Retos, 41*, 123–130. https://doi.org/10.47197/retos.v0i41.82907

García-Aretio, L. (2021). Covid-19 y educación a distancia digital: Preconfinamiento, confinamiento y posconfinamiento [Covid-19 and digital distance education:

Pre-lockdown, lockdown and post-lockdown]. *RIED-Revista Iberoamericana de Educación a Distancia*, 24(1), 9–32. https://doi.org/10.5944/ried.24.1.28080

García-Riveros, J. M., Farfán-Pimentel, J. F., Fuertes-Meza, L. C., & Montellanos-Solís, A. R. (2021). Evaluación formativa: Un reto para el docente en la educación a distancia [Formative evaluation: A challenge for the teacher in distance education]. *Delectus*, 4(2), 45–54. https://doi.org/10.36996/delectus.v4i2.130

Gómez, H. (2014). Itinerario y desafíos de la formación inicial docente en Chile [Itinerary and challenges of initial teacher training in Chile]. *Foro Educacional, 23*, 53–83. https://doi.org/10.29344/07180772.23.1321

Hamdy, H. (2018). Medical college of the future: From informative to transformative. *Medical Teacher, 40*(10), 986–989. https://doi.org/10.1080/0142159X.2018.1498628

Ibaceta-Vergara, C. P., & Villanueva-Morales, C. F. (2021). Entornos virtuales de aprendizaje: Variables que inciden en las prácticas pedagógicas de docentes de enseñanza básica en el contexto chileno [Virtual learning environments: Variables that affect the pedagogical practices of elementary school teachers in the Chilean context]. *Perspectiva Educacional*, 60(3), 132–158. https://dx.doi.org/10.4151/07189729-vol.60-iss.3-art.1235

López, V. M., Martínez, L. F., & Julián, J. A. (2007). La Red de Evaluación Formativa, Docencia Universitaria y Espacio Europeo de Educación Superior (EEES): Presentación del proyecto, grado de desarrollo y primeros resultados [The Formative Assessment Network, University Teaching and the European Higher Education Area (EHEA): Presentation of the project, degree of development and first results]. *Revista de Docencia Universitaria*, 1(2), 1–19. https://doi.org/10.4995/redu.2007.6274

Martínez-Mínguez, L., Vallés-Rapp, C., & Romero-Martín, M. (2015). Estudiantes universitarios: Ventajas e inconvenientes de la evaluación formativa [University students: Advantages and disadvantages of formative evaluation]. *@tic. revista d'innovació educativa,* (14), 59-70. https://doi.org/10.7203/attic.14.4217

Mercader, C. (2019). Las resistencias del profesorado universitario a la utilización de las tecnologías digitales [The resistance of university teachers to the use of digital technologies]. *Aula Abierta*, 48(2), 167–174. https://doi.org/10.17811/rifie.48.2.2019.167-174

Ministerio de Educación (MINEDUC). (2020a). *Protocolo no. 2: Coronavirus Covid-19 en instituciones de educación superior* [Protocol no. 2: Coronavirus Covid-19 in higher education institutions]. https://www.mineduc.cl/nuevo-protocolo-de-prevencion-covid-19-para-educacion-superior/

Ministerio de Educación (MINEDUC). (2020b). *Plan de acción MINEDUC para instituciones de educación superior* [MINEDUC action plan for higher education institutions]. https://educacionsuperior.mineduc.cl/2020/03/18/3504/

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO). (2020a). ¿Cómo estás aprendiendo durante la pandemia de Covid-19? [How are you learning during the Covid-19 pandemic?]. http://www.unescoandalucia.org/blog/como-estas-aprendiendo-durante-la-pandemia-de-covid-19

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO). (2020b). *El coronavirus Covid-19 y la educación superior: Impacto y recomendaciones* [The coronavirus Covid-19 and higher education: Impact and recommendations]. https://www.iesalc.unesco.org/2020/04/02/el-coronavirus-covid-19-y-la-educacion-superior-impacto-y-recomendaciones/

Páramo, P., Hederich, C., López, O., Sanabria, L., & Camargo, A. (2015). ¿Dónde ocurre el aprendizaje? [Where does the learning happen?]. *Psicogente, 18*(34), 320–335. http:// doi.org/10.17081/psico.18.34.508

Prendes-Espinosa, M. P., & Cerdán-Cartagena, F. (2021). Tecnologías avanzadas para afrontar el reto de la innovación educativa [Advanced technologies to meet the challenge of educational innovation]. *RIED-Revista Iberoamericana de Educación a Distancia, 24*(1), 35–53. https://doi.org/10.5944/ried.24.1.28415

Rizo, M. (2012). Intersubjetividad y comunicación: El encuentro alter-ego como eje conceptual para pensar la relación entre filosofía y pensamiento comunicacional [Intersubjectivity and communication: The alter-ego encounter as a conceptual axis to think about the relationship between philosophy and communicational thought]. In I. Vidales Delgado (Ed.), *Filosofía y comunicación: Diálogos, encuentros y posibilidades* (pp. 61–83). Universidad Autónoma de México.

Sánchez-Mendiola, M., Martínez-Hernández, A., Torres-Carrasco, R., Agüero-Servín, M., Hernández-Romo, A., Benavides-Lara, M., Rendón-Cazales, V., & Jaimes-Vergara, C. (2020). Retos educativos durante la pandemia de Covid-19: Una encuesta a profesores de la UNAM [Educational challenges during the Covid-19 pandemic: A survey of UNAM teachers]. *Revista Digital Universitaria (RDU), 22*(5), 1–21. http://doi.org/10.22201/codeic.16076079e.2020.v21n3.a12

Santacruz, E. (2020). Evaluación de las actividades en los entornos virtuales de aprendizaje [Evaluation of activities in virtual learning environments]. In B. Rodríguez-Martín (Ed.), *Docencia colaborativa universitaria: Planificar, gestionar y evaluar en entornos virtuales* (pp. 37–49). Ediciones de la Universidad de Castilla-La Mancha. https://doi.org/10.18239/atenea_2020.22.0

Santana-Sardi, G. A., Gutiérrez-Santana, J. A., Zambrano-Palacios, V. C., & Castro-Coello, R. L. (2020). La educación superior Ecuatoriana en tiempo de la pandemia del Covid-19 [Ecuadorian higher education in the time of the Covid-19 pandemic]. *Dominio de las Ciencias, 6*(3), 757–775. https://www.dominiodelasciencias.com/ojs/index.php/es/article/view/1428

Schutz, A. (1993). *La construcción significativa del mundo social: Introducción a la sociología comprensiva* [The significant construction of the social world: Introduction to comprehensive sociology]. Paidós.

Taveras-Pichardo, L. C., Paz-López, A., Silvestre, E., Montes-Miranda, A., & Figueroa-Gutiérrez, V. (2021). Satisfacción de los estudiantes universitarios con las clases virtuales adoptadas en el marco de la pandemia por Covid-19 [Satisfaction of university students with virtual classes adopted in the framework of the Covid-19 pandemic]. *EDMETIC, 10*(2), 139–162.

Tomás-Miquel, J., Expósito-Langa, M., & Nicolau-Juliá, D. (2016). The influence of relationship networks on academic performance in higher education: A comparative study between students of a creative and a non-creative discipline. *Higher Education, 71*, 307–322. https://doi.org/10.1007/s10734-015-9904-8

Vendura, C. M., Rodríguez, E. N., Zabala, P. A., Martínez, L., Cusumano, A. M., & Bianchi, M. E. (2020). Fortalezas y debilidades de la presencialidad y de la virtualidad: Análisis del desempeño cursadas 2019–2020 en la Cátedra II de Fisiología Humana – Facultad De Medicina – UNNE [Strengths and weaknesses of face-to-face and virtuality: Analysis of performance completed 2019–2020 in the Chair II of Human Physiology – Faculty of Medicine – UNNE]. *Revista Argentina de Educación Médica, 9*(4), 37–44. https://www.researchgate.net/publication/347355541

Viloria, H., & González, J. (2019). Uso de las herramientas comunicativas en los entornos virtuales de aprendizaje [Use of communicative tools in virtual learning environments]. *Chasqui: Revista Latinoamericana de Comunicación*, (140), 367–384.

Zambrano, J. (2016). Factores predictores de la satisfacción de estudiantes de cursos virtuales [Predictive factors of the satisfaction of students of virtual courses]. *Revista Iberoamericana de Educación a Distancia, 19*(2), 217–235. https://doi.org/10.5944/ried.19.2.15112